

Vol. 1, No. 11
November 1986

PRM
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PACKET RADIO MAGAZINE

Dedicated to the Advancement of Packet Radio

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Amateur Net Price Schedule

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PACKET RADIO MAGAZINE is published monthly by the Florida Amateur Digital Communications Association, Inc., 812 Childers Loop, Brandon, FL 33511. (813) 689-3355. Printed in USA. FADCA is a non-profit Florida corporation dedicated to research, development, education, and public service through amateur digital communications activities.

Publisher and Editor: Gwyn Reedy, W1BEL
Assistant Editor: Brad Voss, KE8CW
Subscription Manager: Linda Reedy

POSTMASTER: Forwarding and return postage guaranteed/address correction requested. Please send form 3579 to 812 Childers Loop, Brandon, FL 33511.

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Subscriptions to PACKET RADIO MAGAZINE are available through any of the participating organizations listed below. See individual club pages in this issue for information on how to contact these organizations. If there is no participating group in your area, you are encouraged to join FADCA or TAPR. FADCA membership dues (US Dollars): United States = \$15.00, Canada = \$18.00, Foreign (airmail) = \$25.00. Three dollars of each member's dues is allocated for FADCA operations, and the remainder is for the subscription to PRM. Major clubs wishing to participate in PRM should contact the FADCA office.

PARTICIPATING ORGANIZATIONS

ALA-NET - Alabama Packet Radio Association
CAPRA - Chicago Area Packet Radio Association
FADCA - Florida Amateur Digital Communications Association
GRAPES - Georgia Radio Amateur Packet Enthusiasts Society
KCAPRG - Kansas City Area Packet Radio Group
LAPRS - Louisiana Amateur Packet Radio Society
MAPRC - Mid-Atlantic Packet Radio Council
MARDAs - Mississippi Amateur Radio Digital Assn.
PPRS - Pacific Packet Radio Society
PTG - Packet Technical Group (Detroit area)
RMPRA - Rocky Mountain Packet Radio Association
TAPR - Tucson Amateur Packet Radio Corporation
UPRA - Utah Packet Radio Association

CAPRA MEETING SUMMARY

Compiled by Steve Goode, K9NG

At the November 8, 1986 meeting of CAPRA, it was reported that the wire wrap HDLC board for the clubs 68000 network controller is nearly complete. Code is being written to drive this HDLC board.

Five members who own IBM PC compatible computers were given copies of the TCP/IP code obtained from Phil Karn, KA9Q. These members will begin on the air tests of this code in order to check it out before converting it to the club 68000 controller.

The club is awaiting delivery of a Pac-Com dual port digipeater. This will replace the digipeater at N9ATM-2 allowing connection of the 144.95 MHz LAN to the experimental 220 MHz 9600 bps radios. WB9MJN will place a second TNC on 220 MHz at 9600 bps to allow operation of the WB9MJN RLI BBS on either 145.01 or on 144.95 MHz via the dual port digipeater. The dual port digipeater will also allow members with 220 MHz 9600 bps radios to operate a LAN directly on 220 MHz.

The following members were nominated for offices within CAPRA:

Director: Larry Thompson, W9MSW
Treasurer: George Dorner, W9ZSJ
Secretary: Dick Gulbrandsen, WD9DBJ
Vice President: Don Lemke, WB9MJN and Jerry Werner, WB9WBN
President: Steve Goode, K9NG

Jerry Werner, WB9WBN, has volunteered to chair a committee in the Skywarn net to examine the use of packet within the net. Skywarn is a 5 county emergency weather network activated to report tornado sightings when conditions for tornado formation exist.

The program for the meeting was given by Larry Thompson, W9MSW. He described operation of the TCP/IP code for the PC for those in the club who obtained copies and will begin on the air tests. He also described how the TCP/IP code may operate when placed in operation at N9ATM-2.

- PRM -

Please submit your articles and photographs dealing with any aspect of digital communications for publication in PACKET RADIO MAGAZINE. Both technical and operational topics are desired including new product announcements and equipment reviews, cartoons, anecdotes etc.

=====

A printer's gremlin placed the MARDAs heading over the MAPRC page in the October issue. I apologize to both organizations and to all PRM readers for the error. ed.

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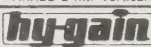
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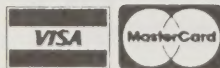
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BICYCLE ODDYSSEY OF A HIGH-TECH NOMAD

(Computing Across America, Chapter 1)
Steven K. Roberts, HtN. (WORDY)
Columbus, Ohio

Computing Across America - what's this? A collection of articles about eccentrics with micros? Tales of satellite socializing? Computer industry forecasts written in academic third-person boring?

Heh. Anything but. Did you ever want to break the chains that bind you to your desk and just take off, wandering the planet while making a living doing whatever it is you love the most? Seems reasonable enough... and three years ago I did just that. Since then, I have been living in an electronic cottage on human-powered wheels, and through this column I'm going to share my adventures with you.

Yes, we'll be covering the burning issues of the day: Adventure, love, danger, weird people, radical extremes of network living, fulltime travel, high-speed flights down mountain roads mottled with Aspen-shade, mycological tone poems, unexpected ice caves, bizarre contraptions, ham radio, satellites, a 200-pound bicycle worth \$100 a pound, real-life wizards, regional humor, outlandish microprocessor applications, ridiculous comments, random controversy, moments of pure anguish, and so much fun that something about it **must** be illegal. For starters.

I am an agent of future shock -- a high-tech nomad, a pedal-pushing freelance writer head over heels in love with that sweet piece of asphalt known as The Road. My home, if I can be said to have one, is Dataspace; my vehicle, the Wondrous Winnebiko. My computer is a Hewlett-Packard Portable PLUS. Yes, I work for a living: my business is to have a wildly exciting life and then tell people about it.

(It's a lousy job, but someone's gotta do it.)

This is the first of a series -- a collection of tales too strange to predict and too diverse to summarize -- an ongoing travelogue of a romantic high-tech bicycle odyssey. As I move into the second 10,000 miles of this open-ended journey, I have switched electronic networks and suddenly find myself in a whole new community. (Why should I restrict my nomadics to **physical** space? Howdy, neighbor.)

So lemme settle in here and take an angle-bracketed <sip> of compu-booze, then tell you a story...

The First 10,000 Miles

In September of 1983, I sold my 3-bedroom ranch home in Midwestern Suburbia and moved to an 8-foot-long computerized recumbent bicycle bedecked with solar panels and enough gizmology to start a science museum. I quickly discovered that this was not to be just another bike tour. Using CompuServe as my link with the universe, I maintained a full-time freelance writing business while pedaling a 9,760-mile journey around the United States.

I lived for the moment -- and it had many. During the 18-month adventure, I fell in love both on- and off-line, encountered a band of convicts in the Maryland woods, sailed through the Gulf of Mexico, tempted fate more than once, and learned more than I could have ever imagined. I overheated in West Texas, froze my ass in Utah, discovered Key West hedonism, and explored the California mystique. In Santa Fe, I saw firsthand the symbiosis between hawk and gawker; in Crested Butte, I witnessed a community so close that everybody's biological cycles are synchronized. I ate crawfish, oysters, and GORP -- I prowled the country seeking the exotic, sexy, and bizarre. The stories flowed like hot breath, and soon the media turned its unblinking eye on me as a high-tech curiosity, a peripatetic eccentric, a symbol of freedom. "Charles Kurault on a bicycle," gushed one local TV station as I pedaled into a perfect cliché of sunset.

And I came to realize, looking back into the eyes of all those people looking wistfully at me, that the greatest risk of all is taking no risk. I noticed (once I stopped trying to score new states) that if you think too much about where you're going you lose respect for where you are. And I dedicated myself to resolving the classic trade-off of freedom versus security -- a task I think I've finally accomplished.

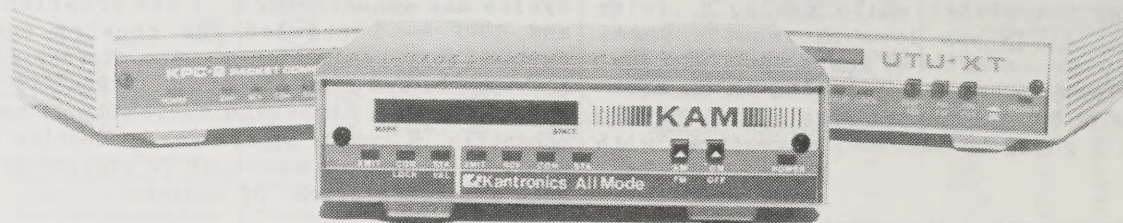
Ah, and the people. When you look like something out of a nonviolent version of "The Road Warriors," you tend to open a lot of doors. Even if most of them turn out to be closets, the numbers are there: I spent months probing the asymptotes of America and finding brilliance in the **oddest** of places. I found communities ranging from the vaporous to the ancient, and was tempted time and again by their seductive tug. And I glimpsed the potential of life online, a life outside the strictures of physics, beyond the limits imposed by image and prejudice. In the electronic pub, brain meets brain and conversation ranges from the bawdy to the sublime.

Life aboard the Winnebiko is a life of extremes. I am at once a being of cloud and soil, satellite and bicycle -- living two simultaneous lives. One is visceral, sweaty, attuned to every hill and headwind -- the other is ethereal, intellectual, an electronic interlocking of imagination and communication. Something about the contrast casts both aspects into sharp relief, and I suppose I've become something of an online proselytizer.

9,760 miles. The journey wound down a year ago in the frenzy of approaching book deadline -- along with the exhaustion of some 2.5 million pedal cranks and over 200 different beds. (Time for the commercial: the book is called **Computing Across America: The Bicycle Odyssey of a High-tech Nomad**. It's being published this fall by Learned Information.)

Anyway, the bicycle sat dormant for a few months in a Silicon Valley attic, then found its way back to the land of its origins for six months on the operating table. And that brings us (far too quickly) to today.

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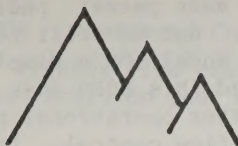
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RMPRA > PACKET

The Official Newsletter Of The Rocky Mountain Packet Radio Assn.

DATELINE:

THE CONTINENTAL DIVIDE

Bob Gobrick, WA6ERB
President, RMPRA

THE GOLDEN SPIKE WEST - As reported by Steve WOGUZ in the September 1986 RMPRA>PACKET quarterly magazine and the October 19 issue of Gateway, digipeater links were established from the Colorado Front Range into the Salt Lake area spanning the Great Rocky Mountains (or as flat-lander Packet Pete Eaton, WB9FLW, would say those illegal mountain towers). The path held up for a good two months until late autumn storms hit Colorado and Utah resulting in lightning hits taking out W0RRZ-1 (Black Ridge, Colorado) and WB7WAB-1 (Blue Mountain, Utah/CO). I remember a talk that Lyle Johnson, WA7GXD, gave at the Wyoming Hamfest where he referred to the special August 86 73 Magazine Packet issue with all of the packet articles and a few minor articles (not packet related) on "Lightning Never Strikes" by WOWUZ. Well as we are now all aware in the Rocky's, lightning is a major concern when you put up 10,000 foot digipeaters. Work is now ongoing to reestablish these sites, but the task will not be easy with the logistics of getting four wheel drives up into those snow covered areas.

THE GOLDEN SPIKE EAST AND WEST II - mean while, back in the flatlands, major work was achieved in linking Nebraska and Wyoming into the Colorado Front Range. With a herculean effort by Jim, KA3IDN, Keith, W7ZAC in Wyoming and Gary, AGON in Western Nebraska a very solid link has been established. This work has inspired a major burst of activity all across Western Nebraska and Wyoming. Reports are now coming of accesses from the digi's at W7ZAC (Casper), W7KMF-1 in Dubois, Wy and KA7SHX-1 in Kemmerer (western Wyoming) of links into Salt Lake. Can it be that the Golden Spike across the Continental Divide is really going to be won by the Cowboys of Wyoming? The December issue of the RMPRA>PACKET quarterly magazine will report on the detailed activities of these links.

THE GOLDEN SPIKE SOUTH - Central New Mexico has been quite active with two HF/VHF Gateways on KN5D and K8BI-1 and two VHF only PBBS's on KA5BEM and KD5VV. Still the elusive link into Southern Colorado has not been established but the gang is planning a major digi on the 11,300 ft. Mt. Taylor (remember the lightning protection).

AMSAT AND PACKET - I've just returned from the annual AMSAT Symposium, hosted by the Dallas AMSAT gang and it was some kind of show. One thing I noticed was the amount of packet talk that was being carried on in the satellite community (no strange coincidence when you consider you have guys like Tom, W3IWI, Phil, KA9Q, and Harold, NK6K, serving on both the AMSAT and TAPR board of directors). From the Rocky Mountain area I ran into active satellite packeteers Dave, WDOHHU, (the voice of the Sunday

AMSAT International net) and Jack AAOP. Some quick briefs:

- Tom, W3IWI, had in tow the Alpha version of the Fuji Oscar 12 modem which TAPR hopes to have ready by their annual meeting in February. Tom's unit was impressive, incorporating features of the modified JAMSAT circuit in the August 86 QEX magazine with added goodies of digital AFC to track for doppler shift, LED "bar graph" tuning indicators, plug compatible TNC-1 and TNC-2 hookups and finally a PSK modulator (for packet weak signal experiments) in addition to the Manchester type FSK modulator needed for FO-12. Tom also had with him the unstuffed AMSAT UK FO-12 TNC modem designed by G3RUH (the board is immediately available for you satellite packet enthusiasts who can't wait).

- AMSAT PHASE IV PLANNING - the "hot" topic of the symposium was the future Phase IV synchronous satellite planning. A major component of this next generation of satellites will be the heavy use of earth stations centered around packet gateways. Since the cost of a launch of this nature will be a major magnitude greater than anything AMSAT has done before, creative ways are being explored to raise the necessary funds. One very attractive aspect of the packet gateway approach is the use of the packet satellite system during emergencies. This has appeal to many public service groups and the FCC who is very interested in how ham radio can serve the public. Be prepared to see the future of ham radio change before your eyes.

- Automatic Az/El Antenna Control for Packet stations: For those of you who have operated through FO-12 you are probably well aware of the "extra hands" that you need to tune the up and down links, position the azimuth and elevation antennas and finally operate your key or PTT. Compound this with future 10 finger (or is it two finger) keyboard activity and you'll realize the increase of nervous breakdowns among the satellite packeteers. Well Frank, WB5IPM, has just what the doctor ordered. Frank had with him a finished prototype of a design that will appear in an upcoming QEX article that allows a Tandy Model 100 (or any computer with a parallel printer port) to automatically drive your az/el rotors (Kenpro's in Franks station) for tracking. Using a Basic program based on the W3IWI tracking program, Franks contribution will be a big step forward in automating stations for packet use (and the design will use mostly easy-to-get RS parts).

WA7MBL SOFTWARE - The Rocky Mountain area is anxiously waiting the 3.04 release of Jeff's WA7MBL PBBS software. Steve, WOGUX, in Rifle, Colorado will be one of the Beta testers. The new version is rumored to have support for up to six TNCs with on-screen indexing, enhanced forwarding file capabilities, and enhanced machine language file transfer features. Jeff also has in the works a new version

DATELINE - continued from previous page.

of his shareware program YAPP (IBM packet terminal program) that will mate with the PBBS software for machine language transfers and DoubleDos support. There are still a number of bugs to be worked out depending what the next version of TNC-2 code looks like, so Jeff would appreciate that all requests be held until the Beta testing is complete (the Beta testers have all been selected). Distribution announcements will be made by the normal channels (Compuserve Hamnet TAPR section) and Wes K7PYK will be handling the distribution details.

KISS TNCs IN THE ROCKYS - Colorado is planning on being one of the hot beds of the next level of packet networking. Bdale, N3EUA, and Andy, NOCCZ, are Beta sites for testing KISS TNC code as reported by Phil Karn, KA9Q, in the October issue of PRM. Although for most packeteers the use of digipeaters and AX.25 code may seem the ultimate, this layer of communications is just at the beginning rung of the packet networking ladder. A possible form of future amateur packet networking protocol (TCP/IP) may consist of converted TNC-2s and bare bones MS-DOS computers sending and receiving IP datagrams in connectionless AX.25 frames. We will be reporting more on this development in the next issue of the quarterly RMPRA>PACKET and here in PRM. Bdale, N3EUA, has the latest code available on his ham/swl FIDO computer BBS at 303-593-0766 for packeteers interested in seeing what it's all about.

- PRM -

"SPOKEN" PACKET FOR THE VISUALLY IMPAIRED

Ted Black, WBOTSX and Kevin Utter, N7GES

Reprinted from the RMPRA>PACKET, Vol. 1, No. 3.

The voice synthesizer is a great invention that can turn silent print on a screen or printer into an open window of communications with a computer or terminal. When connected to a packet radio system, the voice synthesizer makes it possible for a blind amateur to use packet radio with ease, and enjoy the power of this mode of communications.

Kevin (N7GES) owned an ECHO GP voice synthesizer that he had used with his computer - why not hook it up to his TAPR TNC-2 and see, and rather hear, what would happen. Hooking it up meant manufacturing a "Y" cable so that both the ECHO GP and the TRS-80 Model 100 could share the terminal connection on the TNC-2. Only three lines were connected between the ECHO and the TNC-2; pin 1 (optional protective ground), pin 3 (receive data) and pin 7 (signal ground). The remaining lines were not connected to avoid any undesirable interaction between the Model 100 and the ECHO.

Much to my amazement when we powered up the system, the ECHO faithfully recited the TAPR start up message. If you are not familiar with a voice synthesizer, your first experience can be a little unnerving, and its interpretation of a packet radio QSO will be downright entertaining. For instance, it attempts to pronounce everything that it receives - call signs and ham radio jargon included.

The synthesizer has made packet radio operation much easier for Kevin, but he still resorts to his optacon to "read" the Model 100's display when the spoken words are missed (his ECHO does not have a repeat feature). Another operational problem that hasn't been solved is flow control. It is possible to overflow the ECHO's buffer and send it into "babble mode"; that overflow is most likely to occur when downloading messages from the BBS. Kevin uses manual XON/XOFF from the Model 100 when it sounds like overflow may occur.

This is obviously not intended to be an in-depth study of synthesizers or their application. Kevin and I just wanted to make other packeteers aware of our successful experiment. We would welcome your comments, questions or suggestions and we have much more specific information available for the asking. Please mail your requests to WBOTSX at 124 Fishback Ave., Fort Collins, CO. 80521 or N7GES at 1353 Sunset Drive, Wheatland, WY 82201 - a S.A.S.E. would be appreciated.

-PRM-

SHAKING HANDS WITH YOUR TNC

Peter Stone, KOVLD

Reprinted from the RMPRA>PACKET, Vol. 1, No. 3.

If you are using a TNC which connects to your computer via an RS-232 link, then at one time or another you have probably wrestled with the problem of setting up the correct 'handshake' or 'flow control' with your TNC. The need for flow control can be easily understood by thinking of the data flow from your computer as water flowing into a 'bucket' which is the TNC's buffer. The TNC removes 'water' from the 'bucket' as it sends packets out on the air. If your computer sends data to the TNC faster than the TNC can send the data out on the air, the 'bucket' will eventually overflow and some of the information your computer is sending will be lost. Flow control solves this problem by giving the TNC a way of telling the computer to stop sending for a while when its buffer is close to full. After the TNC has 'lowered the water level' enough, it signals the computer that it may again begin sending data. Remember also that characters flow from the TNC to the terminal and flow control will be required in this direction also.

Flow control problems are unlikely to show up during a normal packet QSO because most people don't type fast enough and for long enough to fill the TNC's buffer before the TNC can empty it. Going the other way, most computers can display information presented to them faster than the TNC can send it so the computer's buffer never overflows and loses characters. A flow control problem is usually very evident, however, when your computer sends a long file to the TNC. Since the computer can type much faster than the TNC can transmit the typed characters, the TNC's buffer will quickly fill up and unless the TNC can tell the computer to stop sending until there is more buffer space available, characters will be lost and the transmitted file will be garbled. If you are logging incoming information to your computer's disk, the computer will have to be able to tell the TNC to wait while it periodically writes the incoming information to

Continued >>>

SHAKING HANDS - continued from previous page.

its disk. Without flow control in that direction, the file you record on your disk will be garbled.

TAPR TNCs and their clones (as well as most others) utilize either of two methods of flow control: hardware flow control or software flow control.

HARDWARE FLOW CONTROL uses two additional wires besides the required transmit, receive and ground in the RS-232 connector. One of the wires is used by the computer to signal the TNC that it is safe to transmit data. The other one is used by the TNC to signal the computer that data may be sent. To properly utilize hardware flow control you will also need to make sure that your computer is configured properly to send and receive the necessary flow control signals and that the cable between TNCs and computer has the proper wires connected to the proper pins. Since different TNCs and computers may use different pins for these signals, you will need to carefully read the manuals for your equipment to be sure both the computer software and the TNC are configured for hardware flow control and that the interconnecting cable is wired properly so these signals appear on the proper pins at both the computer and the TNC ends. Hardware flow control is enabled in TAPR TNCs by setting XFLOW OFF.

SOFTWARE FLOW CONTROL uses special characters inserted in the normal character stream to start and stop the flow of information over the RS-232 link. The two characters normally used for software control are XON and XOFF. XON is the character sent when you hold down the control key on your computer and simultaneously strike the letter "Q". XOFF is generated by holding the control key and striking the letter "S". When using software flow control, the TNC monitors its receive line while it is transmitting. When the computer's buffer is almost full, the computer automatically sends an XOFF character to the TNC. When the TNC sees the XOFF, it stops sending data. When the computer empties its buffer and becomes able to accept more characters from the TNC, it will automatically send an XON character to the TNC. The TNC then sees the XON and resumes sending characters to the computer. Thus by sending XOFF and XON characters, the computer is able to start and stop the flow of information from the TNC so no information is lost. The TNC is also able to send XOFF and XON characters to the computer and thus regulate the flow of data the other way. The advantage of software flow control is that it does not require additional hardware or wires in the connecting cable to regulate the data flow. Its main disadvantage is that because XON and XOFF are transmitted right along with the data in the character stream, there is no way for the receiving device to know whether the XON or XOFF it sees are meant for flow control or whether they were simply part of the data that was being transmitted. This is not a problem with normal text since XON and XOFF are non-printing characters and they will never be present in a normal text file.

To utilize software flow control in TAPR TNCs you must set XFLOW ON and define the following: START \$11, STOP \$13, XON \$11 and XOFF \$13. START and STOP define the characters which will start and stop data

flow from the TNC. XON and XOFF are the characters the TNC will use to start and stop data flow from the computer.

It is very important when using flow control that both the TNC and the computer are set up to use the same form of flow control. If they are not configured properly, some very strange and puzzling problems may result. One which I have encountered, occurred when a friend had his TNC configured for hardware flow control but his computer was configured for software flow control. While he was downloading a file from my BBS (with my TNC and BBS computer configured for software flow control), his computer told his TNC to stop by sending an XOFF but since his TNC was configured for hardware flow control, it interpreted the XOFF as just another character to be sent out in a packet. His TNC kept right on sending and his computer missed some of the data in the file he was downloading. Meanwhile, when the XOFF his computer sent was received by my BBS computer, the computer immediately stopped sending since it assumed the XOFF was a signal from my TNC. Since my TNC didn't send the XOFF, it wasn't about to send an XON to the computer. The result was that both the computer and the TNC were waiting for each other with neither willing to speak first. I had to re-boot the computer to get things going again. The end result was that my friend's file was garbled and my BBS had mysteriously died. The problem was difficult to diagnose because the XOFF which caused all the trouble is not a printing character, that is it doesn't show up on the screen and thus there was no obvious way to determine why the BBS wasn't responding. After several mysterious crashes with no apparent cause, I was finally able to figure out what happened by borrowing an RS-232 protocol analyzer from work which enabled me to see even non-printing characters and thus discover what the problem was. For those practical jokers of you out there who may want to try this experiment for yourself, I have since switched to hardware flow control on the BBS so stray XOFFs won't crash the BBS again.

-PRM-

RMPRA MEMBER NOTE: As a reminder, please check your mailing label for expiration of your RMPRA membership. If you have any corrections please contact the RMPRA membership chairman Norm Miller, NOENN.

RMPRA DATA

- Membership: RMPRA membership dues are \$20 annually which includes a year's subscription to Packet Radio Magazine (including TAPR's PSR) and the quarterly RMPRA>PACKET regional magazine.

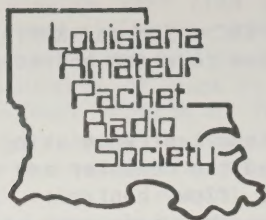
- Voice Net: Sunday 0800 MST 3890 Khz.

- Newsletter material for RMPRA by mail, Compuserve Hamnet (70466,1405) or WA6ERB PBBS via KOHOA HF Gateway.

- Address for all RMPRA business:

Rocky Mountain Packet Radio Association
Bob Gobrick, WA6ERB (303) 986-0189
14311 W. Virginia Dr.
Lakewood, Co 80228

- PRM -



The Official Newsletter of the LOUISIANA AMATEUR PACKET RADIO SOCIETY

How about getting someone to do a Southnet column? I think it would be a worthy cause...

We have good news and we have bad news...the good news is that the long awaited LAPRS patches have finally arrived! The bad news is that PACKET is spelled PACHET! So back they go...maybe Santa will bring us the right ones.

I attended the Southnet meeting in Montgomery, AL and sent the report to all LAPRS directors in the state. It seems to have reached all corners via packet, but if you have not seen it, please let me know. As a matter of fact, I would like to know even if you did receive it. This is one way I can judge the effectiveness of the system and find out where improvements are needed.

Speaking of improvements, thanks to KD5SL and the gang in Baton Rouge, the link between BTR, Slidell and points east is now a rock solid 100%. Thanks guys, we really needed that!

A few phone calls around the state reveal that activity has levelled off a bit. LAPRS continues to grow, however, with a membership of 40 at the end of October. 25 of these are charter members, so to me, this means a real commitment to packet radio. Now is as good a time as any to spread the word about packet. LAPRS has a good supply of VHS and BETA cassettes on packet. These are the TAPR tapes by Pete Eaton. They are well done and run about 30 minutes. A video presentation and a live packet demo make an excellent club meeting program. Please contact NE5S or WD5ELJ for additional information.

One of the most popular packet activities is Bulletin Board operations. You can send and receive not only personal mail, but computer programs and pictures. WD5ELJ has a super set up with an AT clone and a 20 megabyte hard disk, and it really works well. Others make do with Commodores and some others are forced to do without. LAPRS would like to help get a BBS started in each major metro area. IBM PC's and clones are really dropping down in price. A new bare bones system can be put together for about \$600-700. A hard disk will add another \$400. This is a bit steep for an individual or a small club to justify, but if 10 people can come up with a \$100, the job is done!

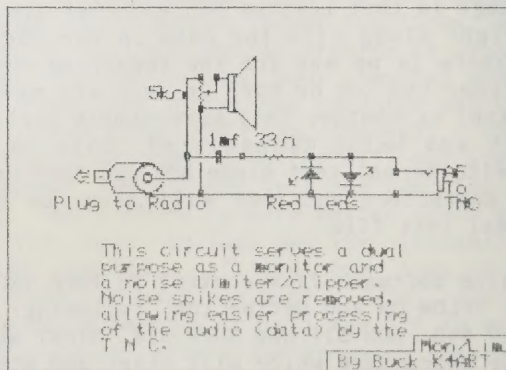
I have started collecting bits and pieces of PC's. If someone upgrades to a color monitor, larger hard disks, a new keyboard or disk drives, I'm usually right there begging for it. If you have resources or sources for such items, please let me know. Perhaps we can come up with a few workable systems and get someone up and running with a good BBS.

Rumor has it that WA7MBL already has, or is about to release, a new version of his BBS software. This is the IBM-PC version of the original WORLI BBS. LAPRS has BBS software for Xerox 820, IBM, and Commodore, so if you have a need, get in touch with one of the LAPRS directors listed below:

1. Shreveport Metro
Jerry Thompson KA5EWC
3035 Boone St.
Shreveport 71108
316-635-6537
2. Monroe metro
E. Benson Scott AE5V
Rt.4 Box 232A
West Monroe 71291
318-396-2424
3. Alexandria metro
Guy Navarro WD5GIV
3716 McCann Dr.
Alexandria 71302
318-445-5815
4. Lake Charles metro
Sam Nelson WA5VDM
3307 E. Napoleon St.
Sulphur 70663
318-527-3481
5. Lafayette metro
Danny Griffith Jr. K5ARH
123 Normandy Rd.
Lafayette 70503
318-989-9039
6. Baton Rouge metro
Jack Coffee WD5ELJ
10026 Hackberry St.
Baton Rouge 70809
504-293-4764
7. New Orleans metro
Emile Alline Jr. NE5S
773 Rosa Ave.
Metairie 70005
504-834-6444

Stay connected....de NE5S

- PRM -



Packet Status Register

NOVEMBER 1986 # 23



Tucson Amateur Packet Radio Corporation

PRESIDENT'S CORNER

Lyle Johnson, WA7GXD

FUJI MODEM PROGRESS

CompuServe

TAPR is now "officially" on CompuServe.

The TAPR CompuServe ID Number is 76246,565. We will be found on HAMNET in Section 7.

The TAPR office account, usually handled by me, although others will be using it from time to time, is for business (ordering, inquiries, etc.) as well as technical questions of a general nature.

Let me emphasize general.

If you are having a problem hooking a TNC up to a TI-99/A computer and it loses every 27th character, asking for a solution to the TAPR account on CompuServe will probably not get you very far.

If, however, you want to know about HF modems, or OSCAR 12 operation, it may be an appropriate place to ask.

When making ANY inquiries, however, please leave your full name and mailing address. We have a tight budget, and it is usually cheaper to reply via US Mail. This is how ALL specific inquiries and orders will be handled.

This past month I have been very busy with the NNC digital and modem boards, the FUJI modem project, HF modem testing and a digital radio project.

NNC Update

I am pleased to report that the NNC hardware is functioning well with 32k-byte RAM chips, allowing it to run a RAMdisk for faster software development. Dave and Chris in Salt Lake have been busy wave-soldering modem boards, so the Alpha sites should have these in hand by the end of the month.

Howie Goldstein has a re-entrant HDLC interrupt handler running on a TNC 2 for use on the NNC.

Richard Green is busy debugging the hardware and software associated with the SCSI port.

Phil Karn reports that his C-code for TCP/IP is too large to compile and run in the NNC environment unless someone knows of a C compiler that can handle the expanded memory capability of the HD64180 processor.

Other Alpha developers - let me hear from you!

As reported elsewhere in this issue, TAPR is undertaking a project to make a 1200 baud PSK modem available for use with FUJI/OSCAR 12's Mode JD packet mailbox.

Tom Clark, W3IWI, has been doing some extensive testing and refining of the design, with inputs from other interested parties. Layout work is being handled by Jack Davis, WA4EJR, and Tom King, KA6SOX, building on previous work done by Chuck Green, NOADI.

If all goes according to schedule (it won't), full prototypes should be operational by early December, with deliverable kits in the very-early 1987 time frame.

Now, don't call the office to place your order yet!

Prices have not yet been determined, and no names will be placed on any waiting list until we are certain that we have a reproduceable kit.

Next month we should have more details for you.

HF Modems

See "Beginner's Corner" in this issue. I hope to be able to report on side-by-side HF testing comparing PLL and filter modems, as well as PLL vs. single-chip modems next time.

Digital Radios

Steve Goode is working out some preliminary designs on a 56 kbps radio, and there are several efforts on to get a 9600 bps radio going. There is even an effort to make a 1200 bps fast-switching radio..

Until next month, happy packeting! (and try 21.097 on 15 meters for some pleasant HF packet QSOs...)

- PRM -

PSX-- TAPR's Packet Software Exchange

IBM-PC and MS-DOS

PAK/UNPAK

\$5 postpaid

This is a program for sending binary files between computers. Submitted by KA9AKM.

So far, this has been the only response to the call for PSX software. More titles will be added as you submit them to us!

- PRM -

BEGINNER'S CORNER: MODEM DESIGN

Lyle Johnson, WA7GXD

The great debate rages on. Filters forever! Slicers never lie! PLLs work better! Get "true DCD" only with this design! Software DCD for HF operation!

Just what are the differences between filter-type and phase-locked-loop (PLL) modems? Why use one type over the other? Is one definitely superior?

If these, or similar, questions have aroused your curiosity, this article may help you decide which type of modem works best for your applications. At the least, it may help you sort out the various claims made by different advertisers.

MOs

The modulator (mo?) of most 300 and 1200 bit-per-second (bps) modems used in Amateur packet radio usually consists of a phase-coherent audio signal varying between two frequencies. (Phase coherent simply means that the signal switches cleanly between the two tones without clicks, thumps or other glitches.)

The most common modulator is the XR2206, which has the advantage of low cost, and the disadvantage of requiring calibration.

The next most common involves digital synthesis, often by lookup tables in a ROM. This has the advantage of not requiring tone calibration; however, post-filtering of the signal may be needed. A post filter may be as simple as a series resistor and shunt capacitor (L-network low-pass filter). And the relative complexity of this approach is often buried inside a single chip, or a small part of a single chip.

Either approach works well.

DEMs

The big difference lies in the demodulator (dem?).

The PLL units most often employ the XR2211. Again, this is a very low cost device that requires calibration. It works, however, and works pretty well.

The filter-type units typically employ two groups of op-amp filters with passbands centered around the two tone frequencies of interest. A "slicer" compares the relative amplitudes of the two channels and indicates which is the stronger of the two.

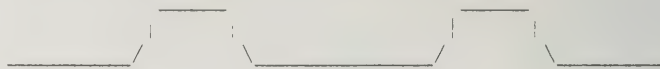
A third approach is sometimes taken using a digital signal processor to analyze the incoming information and make the decisions. Some single-chip modems use this approach.

Which is best? It all depends...

If the data you want to recover is typical RTTY, running at 45 bps and using a tone split of 170 Hz (or 850 Hz), a filter type modem is probably going to work the best, and a PLL probably will work the worst.

"Aha! Then the XR2211 is a bad idea for HF and I should trade in my TNC for a filter unit?" No, I didn't say that.

Consider the signal to be processed. At the slow data rate of 45 bps, the incoming signal will "dwell" on a particular tone for several cycles. At the common RTTY tones of 2125 and 2295 Hz, we will dwell on one tone for at least 22 mSec, or more than 5 cycles at the low tone. This gives the filter system plenty of time to settle down, meaning we can use pretty sharp filters. A spectrum analyzer looking at the RTTY signal might show a pattern like this:



What we see is a lot of energy concentrated around the two tone frequencies, and virtually no energy in the space between them. The wider the shift (or the slower the data rate), the more apparent this becomes.

Now, as you increase the data rate, the space between the two tones begins to fill up with signal energy (information) and we have to widen our filters or suffer the consequences.

In this case the consequences are labelled "intersymbol distortion." Don't let the phrase bother you. If you have ever tried to listen to an SSB conversation with a sharp CW filter in line, you had a hard time understanding the words. Intersymbol distortion. Or maybe you heard ringing with a too-sharp (or overdriven) filter. This is also a form of intersymbol distortion.

It seems logical that at some point, there must be a data rate where the space between the two tones would fill up fairly uniformly and we would see a pattern something like this:



The peak amplitude is less, and the signal is broader. This results because there is less time per bit sent, so the energy per bit goes down. There is no free lunch; we need more margin for this faster data.

But a PLL demodulator can be set up to recover the information in this type of signal very efficiently. And this can be done quite easily.

Remembering the dwell time, at 1200 bps using a 1200 Hz low tone, we have only 1 cycle time in the worst case to base our decision. And the decision must be made much faster than one cycle (0.8 mSec) so we don't have a lot of "jitter" on our decoded signal going to the TNC (which has plenty of other chores to handle without being fed jittery data).

Oh, yes! The magic rate for reasonably flat response and easily decodable signals requires a shift of 2/3 the data rate in bps. Thus, for 300 baud HF operation, we want a shift of 200 Hz (sound familiar?) and 800 Hz for 1200 baud. Wider shifts (1000

Continued >>>

Hz at 1200 baud) reduce the intersymbol distortion further, but at the expense of additional bandwidth.

Of course, a filter-type modem can be set up to handle this 2/3 shift type of signal, too. The question becomes one of whether the PLL is any better, or any worse, than the filter modem. And that one is just plain hard to call. It depends a lot on the circuit used. And how well the operator understands the limits of the modem.

In Tucson, Eric, N7CL, with a little help from his friends, is conducting some very careful tests and measurements using a TNC-2 clone for the PLL and an AEA PM-1 for the filter unit. I hope to be able to bring you some results of that testing next month. It should prove VERY interesting...

DCD

Data Carrier Detect (DCD) is a signal fed to the TNC from the modem that tells the TNC that a signal is being received. This may not seem too important, since the TNC is getting data and the FCS will help a lot in separating data from noise, but it is more important than that.

Most of us have half-duplex radios. We can send data, or we can receive it, but not both at the same time. So, the TNC checks to see if the channel is busy before it transmits.

The simplest way to do this is by way of the DCD line. If the modem suspects that there is a valid signal coming in, it tells the TNC to hold off transmitting.

This is an area where PLL modems hold a definite edge.

Most modems were designed for telephone use. In most countries, when you have placed a phone call, the line is pretty quiet when neither party is talking. In radio terms, we would say there is a good signal-to-noise ratio.

So, most filter modems and single-chip modems use a circuit that simply looks for audio energy within a certain band of audio frequencies. If the energy level is above a certain amount (threshold), the DCD line is set and the TNC doesn't transmit.

Now, listen on a packet channel and open your radio squelch. Pretty loud? An FM receiver generates a lot of noise when no signal is present; this is the OPPOSITE of a telephone.

Thus, most filter and single-chip modems have a fairly useless DCD output when it comes to packet radio use.

Of course, you can use your squelch.

Unfortunately, most radio squelch circuits are very ssslllloooooowww. They can cut your radio turnaround time down by 50 to 100 mSec (some radios take over 600 mSec to turn around, and the squelch is a big part of the reason). This impacts your data transfer rate on the packet channel, and makes you more likely to collide with another station's transmission.

The situation isn't much different on HF. Unless you set your audio and RF levels very carefully, you will get excessive DCD falsing. And this will cause your TNC to hold off a lot, causing the other station to retry unnecessarily.

A PLL demodulator, on the other hand, is less concerned about signal levels. It is trying to locate a coherent signal in all that audio energy. It is continually trying to lock on. If the DCD filter is set up correctly, there will be an amount of delay in the DCD output to ensure that the PLL has been locked onto a signal long enough for it to be considered a true tone instead of simply noise.

WHAT TO DO?

As you can see from the above discussion, the lowly PLL demodulator in your stock TAPR TNC isn't too shabby, especially for radio use. When properly operated, it can give good performance in HF as well as VHF applications.

The key to success is careful setting of the audio input signal to the PLL.

A future article will give details on settings to use. This article should give you some background in understanding why the settings will be what they are.

Stay tuned!

- PRM -

NEW SOFTWARE FOR THE TNC-2 (AND CLONES)

Howie Goldstein, N2WX, is at it again! He has prepared a new release of software for the TNC 2 to utilize the new 32k byte RAM chips. This results in bigger buffers.

The price of the new CMOS RAMs has dropped from \$120 last year to \$20 today!

TAPR has the new chips in stock and expects to have the 1.1.4 software release available for shipment by the 20th. As this is written, the software is being tested, so delivery may slip.

Then again, we may be on time!

See the price list in this PSR section for details.

- PRM -

RENEWAL REMINDER

Please check your mailing label on the front cover of this issue of PRM. If you are a TAPR member, there will be a number in the center of the top line. It indicates the month and year of your membership expiration.

If your expiration date is 02-87 or earlier, please take a moment to renew.

Don't put it off, or you may miss an issue or two of PRM and PSR!

- PRM -

TAPR ANNUAL MEETING

Tucson Amateur Packet Radio will be holding its annual meeting during the weekend on February 21 and 22, 1987.

Your Board of Directors plans to meet all day on Friday, the 20th.

Friday night activities will include the traditional Pizza gathering, followed by racing at the Malibu Grand Prix.

Saturday, the Theatre Royale at the Embassy Suites Airport Inn (formerly Granada Royale) is reserved from 9 AM through 5 PM. The day's activities will include presentations from packeteers from various areas on numerous subjects. As in previous years, a catered lunch will be served.

Saturday night, we will gather at the Triple-C Chuckwagon Ranch for an old-fashioned western meal and entertainment.

Sunday morning the Theatre Royale is again reserved from 9 AM until 1 PM. This is to allow more and better presentations during the meeting.

The early afternoon adjournment should provide ample time for folks to drive home or catch a plane from Tucson International Airport.

More details will be published as the big weekend approaches. If you want to speak, contact the TAPR office and let us know so we can begin planning early.

See you in February!

NOTE: Since the Board will meet on Friday, all voting must be done by mail. No ballots will be accepted at the annual meeting, so those of you accustomed to procrastinating until then will be finding yourselves disenfranchised! Please vote in a timely manner, using the ballot that will be found in your January PSR.

- PRM -

CONNECT INTERNATIONAL

The Radio Society of Great Britain (RSGB) has launched a brand new newsletter devoted entirely to Packet Radio. "Connect International" will run about twelve pages monthly. Delivery outside Europe will be by air mail.

Content will cover a wide range; full length technical articles, discussions on packet hardware, software, protocols, networks and standards, digipeaters and packet switches, mailboxes, news and views, bugs and fixes, beginners column, reference documentation, packet operation, special interest groups, international packet register, satellite and emergency data communication, plus a truly international coverage with up-to-the-minute news of activity and developments from packet groups and individuals throughout the world.

TAPR PRICE LIST

The following price list is current for November, 1986.

Memberships:

Associate (no PSR/PRM)
\$5.00/year
Full (PSR/PRM included)
\$15.00/year in the US
\$18.00/year in Canada
\$25.00/year elsewhere

Accessories:

HF Tuning Indicator Kit
\$25.00 postpaid in the US
(see October 1985 PSR for circuit)
FUJI/OSCAR 12 PSK Modem
To Be Announced
9600 baud Modem Semi-Kit *
\$25.00 postpaid in the US
(see K9NG article in 4th ARRL Proceedings)
FADPAD Xerox 820 Adapter *
\$25.00 postpaid in the US
(PC board and data only)
LSC-10 Coffee Mug
\$5.00 (only at Hamfests!)
(and the Annual Meeting...)

* These products are for experimenters and are neither complete nor supported by TAPR.

Education:

Introduction to Packet Video
\$10.00 postpaid in the US
(available in VHS format only)

TNC 2 Software/Hardware:

TNC 2 Software Upgrades
1.1.3 uses 16k RAM
1.1.4 requires 32k RAM chip
\$12 postpaid
Reprogram your EPROM
\$2 plus postpaid return mailer
32k byte RAM chip, low power, 150 nSec
\$20 postpaid

OEM Packages:

TNC 1 OEM package
\$500 one-time charge
TNC 2 OEM package
\$5,000 one-time charge plus royalties

In addition, we stock spare parts for TNC 1 and TNC 2 units. Call or write for your specific requirements.

- PRM -

"Connect International" will be edited by Ian Wade, G3NRW, the well-known compiler of the "Data Comms" feature in **Radio Communication** and will be produced and circulated by the RSGB.

Be among the first to receive this exciting new publication. Please write to RSGB Headquarters to subscribe to the new publication. Enclose payment with your application. Funds should be in pounds sterling. North American rates: L6.93 for the first nine issues.

RSGB, Lambda House, Cranborne Road
Potters Bar, Hertfordshire, England EN6 3JE

PRM -

NOMINATIONS ARE NOW OPEN

It is that time of year again. Now that your TV screen is clear of the usual mud-slinging, acrimonious political advertising, it is time to consider something really important. I am referring to your TAPR Board of Directors.

As you probably know (but some of you newer members may not), TAPR is governed by a fifteen-member (15 -count 'em! That's more than General Motors!) Board of Directors. Each Director serves a term of three (3) years, and, due to staggered terms, one-third of the Board, or five (5) Directors, are elected every year.

The current Directors' terms expire as follows:

Mike Brock, WB6HHV Feb 1988
 Tom Clark, W3IWI * Feb 1987
 Pete Eaton, WB9FLW * Feb 1987
 Andy Freeborn, NOCCZ Feb 1988
 Steve Goode, K9NG Feb 1989
 Eric Gustafson, N7CL Feb 1989
 Skip Hansen, WB6YMH Feb 1988
 Lyle Johnson, WA7GXD Feb 1989
 Scott Loftesness, W3VS Feb 1989
 Dan Morrison, KV7B Feb 1988
 Margaret Morrison, KV7D * Feb 1987
 Harold Price, NK6K * Feb 1987
 Bill Reed, WD0ETZ Feb 1988
 Gwyn Reedy, W1BEL Feb 1989
 Pat Snyder, WA0TTW * Feb 1987

Nominations are now open for the seats expiring February, 1987 (marked with an asterisk - *).

Any member of TAPR may nominate any member for the Board.

To place a name in nomination, just send a letter to the TAPR office with the name of the person you wish to nominate (including yourself, if you like). It would be helpful if you would also provide us with your nominees telephone number and any qualifications you think your nominee has for the office.

We will then get in touch with him (or her) and obtain the person's direct consent to run. At that time we will ask for a statement from the nominee for publication in PSR. (We won't print your picture, so don't let that stop you!)

"What is required of a Director?" you ask.

A Director is expected to attend the Board of Director's meeting and TAPR Annual Meeting in February of every year in which he (or she) holds office. The meetings are held in Tucson, and TAPR does not reimburse expenses for this trip. This means, depending on where you live, a commitment of a few hundred dollars per year.

The Board of Directors reviews the previous year, establishes goals, elects the Officers, and generally guides the organization.

The schedule for this term's election process is as follows:

Event	Time
Request for Nominations	November 1986
Deadline for Nominations	December 15th, 1986
List of candidates and ballot	January 1987

So, submit the name of someone you think will do a good job and get it in to the TAPR office today!

- PRM -

TAPR MEMBERSHIP APPLICATION

Tucson Amateur Packet Radio Corporation
 P.O. Box 22888, Tucson, AZ 85734

Name: _____

License
 Callsign: _____ Class: _____

Address: _____

City &
 State: _____ ZIP: _____

Home Phone: _____ Work Phone: _____

If you wish to have any of the above information not be published in a membership list, indicate the items you wish suppressed: _____

I hereby apply for (select one) full / associate membership in Tucson Amateur Packet Radio Corp. I enclose \$15.00 (full) / \$5.00 (associate) for one year's membership dues. I understand that \$10.00 of my dues (full members) are for subscription to the PACKET RADIO MAGAZINE (PRM). Associate members do not receive any publication. The entire amount of

the associate membership dues and \$5.00 of the full membership dues go to support TAPR's research and development activities in packet radio. My signature indicates that I desire to become a TAPR member, and subscribe to PRM (full members only).

Signature: _____ Date: _____

The Tucson Amateur Packet Radio Corporation is a nonprofit scientific research and development corporation. The corporation is licensed in the state of Arizona for the purpose of designing and developing new systems for packet radio communication in the Amateur Radio Service, and for freely disseminating information acquired during and obtained from such research.

The officers of the Tucson Amateur Packet Radio Corporation are:

Lyle Johnson, WA7GXD President
 Pete Eaton, WB9FLW Executive VP
 Heather Johnson, N7DZV Secretary
 Terry Price, N6HBB Treasurer

Tucson Amateur Packet Radio Corp.
 P.O. Box 22888
 Tucson, AZ 85734
 (602) 746-1166

FADCA > BEACON

THE FLORIDA AMATEUR DIGITAL COMMUNICATIONS ASSOCIATION

WRITE ONLY MEMORY

Ted Huf, K4NTA

I have operated a packet radio BBS for a long time at this QTH. My first was using my brand new TNC Beta board, now know as a TNC-1. The BBS ran on a R/S Model 3 and was converted from a landline BBS. About a year and a half ago I converted over to a Xerox 820 and the famous WORLI MailBox.

Time passed and I was able to upgrade my computer to a XT Clone sporting 640K, 20 meg hard disk and turbo board. Boy what a machine! Now with Double-Dos I could even do two things at once.

Well there was nothing else to do but switch over to the BBS written for the IBM PC (MS-DOS) by Jeff, WA7MBL, out in Utah. Jeff did a fine job on his BBS software, but, I think that he wrote it based on a very early version of the WORLI software and it did not have many of the nice features of WORLI 11.6.

Much is going on right now in the packet BBS software world. Hank, WORLI, and his helpers are working a new version of the WORLI MailBox written in the C programming language. As it is written in C, it should be portable to any machine for which there is a C compiler. Rumor has it that it will be ready for release in the first quarter of 87.

Jeff, WA7MBL, is about to release his new 3.0 version that has been rumored to support TNCs on as many as four serial ports and allow simultaneous connects on each of the ports. As far as I know, Jeff's software will still only run under MS-DOS.

The development that I really wanted to tell about this time is a program done by Peter Stone, KOVLD for the IBM PC.

Peter's program called an emulator is a CP/M emulator that runs under MS-DOS on an IBM PC or clone. One of the programs called CPM.COM is the CP/M emulator which will allow you to run programs written for CP/M and the 8080 or Z-80 CPU.

The other called WORLICPM.COM handles the special changes made by Hank to the operating system on the Xerox 820 for his software.

CPM.COM even be used to assemble and link the macros that make up the WORLI program using M80.COM and L80.COM but running on a PC. The emulator does run a lot slower than a CP/M program running in its own environment on a Z-80 machine.

The nice thing about running the WORLI software again is having the source. I have modified my 11.6 so that it will skip over the "hit any key" line and long menu for the sysop when he first starts up the system and go right to the [A]uto answer mode. The

clock in the WORLI software is loaded by the emulator from the PC system clock which in my case is battery backed up so there is no problem in using a AUTOEXEC.BAT to bring the BBS on line in the event of a power failure.

I don't know who is set up to distribute this software so I will not mention Pete's address here. I will copy it for any who wants it if you send me a formatted (360K) 5-1/4 disk in a self addressed and STAMPED mailer.

Last month in PRM a list of WORLI type BBSs were listed. I had something to do with the updating of the list which I got via packet from another BBS. Well, I don't know how I did it, but, I managed to edit my own BBS right off the list! Just to set the record straight, K4NTA is still around on 145.01 and 145.03 from Stuart, FL. HI!

Seventy-three and happy packeting until next time.

- PRM -

*** FADCA is coordinating our digipeaters in Fla.***
** If you are planning to put up a digipeater, **
** contact FADCA at 812 Childers Loop, Brandon, **
** FL 33511 for registration forms. **

FADCA PACKET FREQUENCY COORDINATING COMMITTEE

Tom Kneisel, K4GFG

FADCA's PFCC held a meeting in Ocala on November 1. It was held in conjunction with the Northern section of FADCA's Network Coordinating Committee.

The PFCC is reviewing a packet bandplan for six meters which would utilize 50.62 to 50.78 paired with 51.62 to 51.78 Mhz, with channels on 20 Khz spacings. The frequency of 51.70 would be for packet simplex and 50.70 (which is the national RTTY frequency) is excluded from the plan. If you are interested in 6m packet and have any comments on this plan, the PFCC would like to hear them.

Information for the next ARRL Repeater Directory is being compiled. If you are a digi trustee, you will receive a note in the mail showing how your digipeater will be listed. The PFCC will be listing only those digipeaters which have registration forms on file with us.

The inputs will go to the ARRL on Dec. 1. After consulting with K4LPT from Crestview, the PFCC revised the two meter packet bandplan to change Tallahassee and Crestview to 145.09, and to add more frequencies for the Panhandle. The plan was given final approval and adopted as shown below. See May or July PRM for additional details.

Continued >>>

The Motorola Amateur Radio Club in Plantation received coordination on 145.05 for a gateway digipeater to link Naples into the East coast 220 Mhz backbone. They proposed to use high power and high gain antennas horizontally polarized on 145.05 for the link.

K4GFG submitted his resignation from the PFCC, effective Dec. 31, 1986.

The next PFCC meeting will be held in conjunction with the Northern section FNCC meeting in Gainesville on Jan. 10, 1987.

Florida Two Meter Bandplan

- 145.01 Pompano Beach, Ft. Lauderdale, Miami
- 145.03 Ocala, Port Charlotte, West Palm Beach, Pensacola
- 145.05 Lake City, Daytona, Tampa, Stuart, Naples, Port St. Joe
- 145.07 Jacksonville, Clearwater, Boca Raton, Marianna
- 145.09 Crestview, Gainesville, Melbourne, Sarasota, Tallahassee, Homestead

Temporary: Miami 145.03, Orlando 145.03, 145.07, Jacksonville 145.03, Sebring 145.05, Hollywood 145.05

- PRM -

PACKET COMPUTING POSSIBILITIES

Chuck Harrington, WA4GPF

Beginning this month I am changing the name of my column, formerly PACKET ON THE ATARI ST. I hope to attract a larger readership and write about some new topics, some of which are not specific to the ST or any other particular computer system. ST users may be reassured that they will not be forgotten, for the ST coverage will still remain as a portion of this column.

I wonder how many people, before they became active in packet radio, had expectations of downloading new public domain software from distant BBS systems? I did, but before the shipping carton from my first TNC had been picked up by the garbage man, reality took hold; packet now and then dealt primarily with transfers of small text files.

Almost all operation in packet uses the TNC's converse mode, which permits only the use of Ascii characters. Although Basic and other "source" codes may be sent as text, some of the best software must be transferred as a binary file.

Binary transfer in the current TNC is supposed to take place in something called transparent mode. But, all of the BBS systems operate in converse, so how can you possibly upload a program to them? In order for a BBS to accept a binary file their software would need to control the TNC somehow, and get it into and out of transparent mode as needed.

This may be possible, but we have a large WORLI BBS system in place whose software does not support such a feature. Of some additional concern, is the effect that binary code might have on the TNC that are monitoring the channel at the time of the file transfer. Binary uses all 8 bits, and will contain all bit combinations from 0 to 255, including nice things like <Esc> which is clear screen to some terminals. Suddenly these program transfers seem best suited for real time, on an appropriate frequency other than that used for normal packet operations. But if you can reach the guy direct, he is probably close enough that it would be easier to meet him for coffee and hand him a disk, rather than transfer him the file over packet! But how do we get a file to someone in a different lan?

Much can be done to bring real program transfers to packet radio. There is no reason that our BBS systems on packet, can not contain downloadable program files. A new protocol is badly needed if this is ever going to happen! We need to face the facts that sending a file over packet, is not the same as sending one over the telephone, and adjust our software accordingly. Lets compile a wish list of the features which are desirable for binary file transfer over packet.

1. The ability to transfer and forward binary files through the existing WORLI BBS system.
2. The ability to break binary files into pieces of convenient size for packet transfer.
3. The capability to use the portion of the file received correctly while filling in any missing segments later.
4. The ability to send binary files in converse mode and not have to worry about control codes causing problems to other stations.

It sounds almost too good to be true that the above four requirements could be easily met, but they have. In past weeks, Florida packet operators have been seeing some strange packets coming across their screens as I worked with a new protocol for binary file transfer. On November 1, 1986, I forwarded the first "Blocked Hex Protocol" file from Orlando to Jacksonville via K4OZS BBS in Ocala. The file was downloaded at Jacksonville and successfully run by Bob Grant, WD4BIW on his 1040 ST computer system.

The new protocol is not just for the Atari ST, it may be used on any computer system; I have tried to anticipate the needs of programmers implementing it on different systems. It is my hope that through this or some other protocol, we can finally begin to exchange computer software over packet radio. I trust that the packet community will use these new file transfer capabilities in a responsible manner, sending only "Public Domain" software over Amateur Radio and not Copyrighted software! I am sorry to say that at this moment, I am unable to release the exact specifications for my experimental protocol until the final version has been nailed down. I will try to make the details available to those interested as soon as possible in the next version of PRM.

Several developments with the Atari ST may be of interest to packet operators. The first, is that Atari has finally released the long awaited CP/M emulator. Of great surprise to me was the fact that the emulator has been put in the public domain and is presently available free of charge over many of the phone BBS systems! It is said to be a much better emulator than that written for the C-64 and other systems and with the power of the ST, CP/M may well run as fast as the on the 8 bit machines. I have not tried this emulator yet, but can't help wondering if there is any possibility of getting the WORLI code to run on this until WORLI type software can be developed for the Atari ST's own operating system. I have heard that there is a problem with the RLI code running on anything but a Xerox 820?

Rumor control has it that the 520 ST will change in January and that a new 520 will be in production. According to the phone BBS hotline, the new machine will look like the 1040 ST, but will contain only 512K ram and a single sided disk drive.

To expand on a teaser I gave last month, a new version on PACK-ET-TERM, my split screen packet terminal program for the Atari ST, is under development at present. Among its new features will be implementation of the new file transfer protocol mentioned earlier and like all PACK-ET-TERM programs, it will be free to anyone who wants it. Well, that is it for this month. I have a lot more to write about in coming months and look forward to continuing these articles in their new format.

*** Disconnected from WA4GPF!
- PRM -

INTERFACING A C-64 TO A XEROX 820

Joe Brunham, WD4KAV

I have been running the WORLI mailbox code on a Xerox 820 for several months now, and was seeking a way to transfer several program and data files from the 64 to the Xerox.

WORLI has provided software to permit the use of a terminal via the printer port, but some way was needed to slow down the normal 9600 baud out of this port so that the two machines could understand each other. I contacted Ted Huf, K4NTA, who said it would be a relatively simple matter of modifying CBIOS.COM, and wiring up some cable.

Ted successfully modified the file to permit a painfully slow 300 baud rate (the only one just about SURE to work with most any Commodore terminal software). My first attempt at getting the two machines to communicate was a failure. Investigation showed that pins 4 and 5, then 6, 8 and 20 needed to be jumpered at the male DB 25 connector that plugs into the 820 printer port, with pins 2,3, and 7 connected to both the 820 and the 64.

I have uploaded several files from the 64 to the 820 using the above modifications, with the addition of an intelligent terminal program on the 64 operating under XON XOFF flow control. Downloading from the 820 to the 64 should work too, though I have not tried it yet.

Higher baud rates could probably be used on the printer port if the 64 were to be used as a simple keyboard (dumb terminal) with no need to worry about file transfer from one system to the other.

One final note. All the above DOES NOT mean you can run an RLI BBS on an 820 with a 64 plugged into the printer port. A "real" keyboard still must be plugged into the keyboard connector on the 820 and used to bring up Hank's software at power up (pressing "A" to call up the OS). [Comments in CBIOS.MAC lead the way to modifying the sourceed]

- PRM -

Press Release

Amateur Packet Alaska announces the availability to the amateur packet community of the APA VHF/HF switch. The APA switch is designed to allow the TAPR TNC-2 or TNC-1 (or any clone such as the AEA PKT-1 and PK-80, GLB TNC-2A, MFJ-1270, Pac-Comm TNC-200, Heath HD-4040 etc.) to be instantly switched from VHF/1200 baud to HF/300 baud operation without retuning or recalibration. The switch is based on the 4066 quad CMOS integrated circuit and can be switched manually or by logic supplied externally. A simple toggle switch is included. The switch is supplied in kit form and is furnished with prime 1% precision temperature stable parts.

The APA switch, which has been operational in the Amateur Packet Alaska Network for several months, is easy to build and install and comes with step-by-step instructions. Assembly and installation usually takes less than an hour. The switch is totally enclosed within the TNC cabinet and requires no drilling of the printed circuit board. In operation the switch changes all of the components critical to the mode change and provides a new set of potentiometers for 300 baud operation. The TNC's original calibration components are used for 1200 baud operation.

The price of the APA VHF/HF switch including airmail postage is \$30 by check or money order. As an all volunteer organization, APA is not equipped to receive telephone or credit card orders. APA also has available a 15 page monograph on VHF/HF switch designs for a SASE and \$3 to cover copying costs.

Amateur Packet Alaska is a nonprofit educational, research and public service organization dedicated to linking Alaska and the World by amateur packet radio.

Amateur Packet Alaska, AX.25 Communications Trail, Ester, Alaska 99725.

- PRM -

FOR SALE

HDLC controller chips for TAPR TNC-1, HD-4040, AEA PKT-1, etc. Used WD1933, date coded 1983 (good mask), 120 ns parts, tested and guaranteed. Price including shipping, \$10.00.

Doug Drye, 3336 Hunters Lodge Rd, Marietta, GA 30062

PRM -



GRAPES

President: Paul Quillen, N4LCD
Vice-President: Justin Myrick, N4LEL
Secretary: Dave Chapman, KD4LM
Treasurer: Garey Barrell, K4OAH

Georgia Radio Amateur Packet Enthusiasts Society

Meeting: 4th Saturday, Western Sizzlin, Buford Hwy., approx 1 mile north of 285, just south of Ham Radio Outlet, 10 a.m. to Noon.

Dues: \$20.00 per year (includes subscription to Packet Radio Magazine).

.03 Lan Status Report

We've located the primary problem with the KF4JJ-1 digi. The cavity had filled with water, causing incredible insertion loss. We have removed the cavity for refurbishing. The digi is being desensed by Channel 11 (Ch 11's main antenna is only 30 feet above the digi).

When the cavity is returned to service, the sensitivity of the digi will return. The GLB TNC at the digi had also failed. Currently we are using an IC25H and a Kantronics TNC on temporary loan. As soon as the GLB is repaired, we will reinstall the KDK144 and the GLB.

The LAN digi, KF4JJ-1, is located 970 feet up the WXIA-TV transmitter tower (2050 feet MSL). The tower is on Arizona Ave. off DeKalb Ave. in East Atlanta. The current antenna is a G6 mounted on the Southeast face of the tower. To improve our coverage, we have designed a 3 element phased array that will give us a more nearly omni directional pattern and is designed to have positive null fill for close in coverage.

Currently WB4BSG is finishing the dual-port board we will be installing at the digi. When complete, we will be installing a 440 Mhz radio at the digi to link us through KD4NC into the 13/73 West Atlanta LAN, the Georgia backbone, and the Alabama backbone.

On the BBS front, we are still looking for someone to take over from KA4OVX who, since returning full time to school, is finding it difficult to keep up with sysop chores. Meanwhile, WB4BSG has a BBS running on a PC using a CPM emulator that allows unmodified WORLI BBS software to be used. This is intended to be a backup for the regular LAN BBS.

The satellite gateway project is moving forward. Byron, W4BIW, has automatic antenna control software running on a dedicated C64 using the interface developed by the Ga. Tech club. Barney, W8KJM, is installing the Xerox 820 BBS donated by KE4ZV in its cabinet. Byron has ordered the AMSAT-UK PSK modem board and Barney has gathered most of the parts needed to stuff the board. Byron has installed a HAZER system on his tower to ease antenna maintenance. Eric, AA4SW has loaned a TNC1 and the LAN has ordered an MFJ for the gateway. KE4ZV has figured out the automatic doppler AFC interface to an IC451 for automatic downlink tracking. Doppler compensation for the uplink is still under development.

The JARL has not yet activated Mode JD of FO-12 due to the post-launch tumbling the satellite is experiencing. A passive magnetic stabilizer on board FO-12 will eventually damp the satellite's motion. When activated, FO-12's mode JD will allow same day delivery of digital messages to any point on the globe. Our LAN members will have access to the satellite through the gateway.

	Digipeaters
145.01	WB4GQX-1, Sawnee Mtn., Cumming
145.03	KF4JJ-1, East Atlanta LAN, Ch 11 Tower, 970'
146.73 -	KD4NC-1, West Atlanta LAN, Sweat Mtn., Duplex
145.09	WB4GQX-4, North Georgia LAN Amicalola
224.9	Lockheed (Marietta)
14.103	K4BYK, Cumming
3.696	WB4GQX, Cumming (Southnet Experimental)
145.09	AA4EO-1, Fairmont
145.09	W4GZX, Cleveland, TN
145.01	NC4G-1, Rome
145.09/.01	WD4OQC, Cleveland, TN Gateway
145.09/.01	WB4GQX-3, Sawnee Mtn, Cumming, Gateway
145.01	W4DSK-1, Lookout Mountain
145.01	WA4TXT-1, Hampton
145.01	WB4BXO-1, LaGrange

Grape Notes

At the October GRAPES meeting it was suggested by AA4SW, Eric, that we try to keep the LAN's and LAN organizations together by a simple publication. Two "prime movers" in each primary LAN will receive this monthly newsletter sponsored by the GRAPES. The purpose of the newsletter is to let all LAN areas know what is going on in each respective LAN.

LAN's are encouraged to submit a monthly report of LAN activities. It will be published in *unedited* format in this vehicle and mailed to two members of each LAN. The content can be anything from criticism to support, facts and LAN happenings. This information could be republished in any other publication. Portions might therefore appear on bulletin boards, Packet Radio Magazine, or other local or national publications.

The purpose is not meant to be a full blown newsletter, but rather a forum of Georgia LAN events and progress. It was agreed that for Networking to become a reality, we will need this type of rudimentary cooperation from all the groups within the state.

At times there have been disagreements among LAN's and it seems that it was borne more by misunderstanding of the objectives of Packet Networking and the uneven progress made in the different areas. Any kind of forum or communication that will help in reaching that goal with the least amount of agitation, hurt feelings and politics will be most welcome.

Any copy submitted from the LAN might be retyped by the editor but no content would be altered.

Tentative mailing date for copy submission for 1986 and 1987 is the **20th day of the month** and publication will be the first week of the following month.

Copy to be submitted to:
 Dee Knox / K14QZ, 2279 Clairmont Circle,
 Snellville, GA 30278 / (404) 972-3234

or via packet:

@ KA4OVX (BBS)

News On The NNC Front

Network software development is proceeding slowly. KE4ZV has four-port digipeater code ready for testing for the NNC. Porting of TNC code and IP switch code is proceeding. A good assembler and linker as well as a C Compiler have been obtained for the NNC. A version of TCP/IP is running at KE4ZV on the IBM PC. This software requires a new ROM in the TNC implementing what is called a KISS TNC. We are looking for a C64 developer to port this code over to that popular machine. The code is written in Aztec C and is portable except for two small assembler modules which will have to be rewritten for any machine that hosts it.

North Georgia LAN News

The August meeting of the LAN was held in Cartersville, GA and items of interest covered at the meeting were:

1. What should be done in order to increase the reliability of the North Ga. LAN digipeaters. This entire system was installed during the winter months and worked so well at that time, that no one would have dreamed of the problems which the record breaking summer weather would produce. The path from GQX-4 to EO-1 tends to fade away during the heat of the day. Other digis within the mountains are having path problems during these hot days also. Final decision was to increase the power on EO-1 and GQX-4 to the hundred Watt or so level. It was felt that at this power level, the path should become very solid.

2. There are some areas to the extreme western end of the LAN that have trouble from time to time using the LAN digipeaters. Obvious solution here, we need another machine in the western part of the LAN in order to provide coverage toward the Alabama line. Thanks to a lot of interested people, a new Digipeater will be installed in Kingston.

3. Members present felt that these RF hardware changes should be installed during the hottest part of the summer since we know all paths work fine during the cooler months.

4. It was noted that things really happen fast when there is a good supply of interested and hardworking people within the LAN. Obviously we do.

5. Discussion was held concerning another HF BBS for the LAN. Discussion has been held previously concerning another VHF BBS. It was felt that we could probably utilize another BBS provided it was placed on the opposite side of the mountains from W4KAU. This would tend to "RF isolate" the two systems so that both would be able to run at the same time without interference. This concept and the addition of another HF BBS will be studied.

6. WD4OQC, John, reported that he is now an active member of the NNC software development gang and has recruited another programmer to help him in his efforts.

Current officers of the North Georgia LAN (145.09) are:
 President, W4KAU; Secretary/Treasurer, WB4OSD; Technical Coord., WD4OQC.

PRESIDENT'S REPORT

Walter E Miller, AJ6T

The WESTNET system of automatically linked BBS on 145.01 continues to grow, but at a slower pace than in the last few months. Links now exist from California to Utah and probably into Colorado by the time this is printed. Most (but not all) of the autoforwarding is done at night, but 145.01 is still a chaotic frequency, since most of the local BBS access and forwarding occurs on this one channel. In an effort to bring more harmony to this system, the Northern California BBS sysops have called a meeting on November 22 at the Richmond Red Cross to form a SYSOP organization. Hopefully, some operating guidelines to reduce network overload will be forthcoming from this new group.

NARCC has appointed George Flammer, WB6RAL, to its Board of Directors as Packet Radio Frequency Coordinator. George is also a member of the PPRS BoD. NARCC is responsible for coordination of all repeaters and digipeaters in Northern California. NARCC is leaning toward coordination of BBS as well as digipeaters. We currently have too many closely spaced digis and BBS on 145.01, and not enough digis on other channels. I hope coordination serves to spread the stations out and make 145.03 to 145.09 more useful, and 145.01 less contentious.

According to Greg Campbell, WB6ASR, trustee of W6AMT, the AMT organization is considering the creation of a parallel chain of linked digipeaters on 220 MHz to complement the current AMT network on 145.01 (W6AMT-0,1,2,3,4,7). Recognizing that reliable 9600 baud hardware suitable for mountaintop use is not available yet, Greg envisions that the 220 links would be at 1200 baud. Current hopes are to extend this 220 chain at least as far south at W6IXU. Greg mentioned that he and George had recently repaired W6AMT-1 (King City) which had been intermittent due to a power supply cable problem. W6AMT-0 was also down in late October, apparently due to a dead AEA TNC1. Plans are to replace it with a new TNC2 clone. The SF Bay Area gets very quiet on 145.01 when W6AMT-0 is off the air. About 850 different callsigns have been digipeated through AMT-0 during the last nine months (as logged by Greg's WA7MBL software).

Until new parallel networks, 9600 baud digis, level 3 software, smarter BBS, or some other breakthrough arrives to save us from ourselves, the most useful way to make packet operations more efficient and pleasurable is to IMPROVE OPERATING PROCEDURES. If you are going to choke up a channel with useless packets (like infinite retries into a distant BBS, or beacons every minute to announce that you are not home, or long loopback auto connects, etc., ad nauseam), at least do it on a channel other than 145.01 MHz. If you are going to have a keyboard-to-keyboard QSO direct or through one or two digipeaters, don't do it on 145.01 if another path is available. Please get a copy of WA6NHC's PATHFINDER list and experiment with the digis on 145.03, 05 and 07. If you are new to packet, learn the difference

between COMMAND and CONVERSE modes on your TNC, so that you don't transmit when you think you are sending a command to your TNC. Be careful about the setting of your UNPROTO path, so that if you do make an inadvertent transmission such as "C W6XYZ VIA W6AMT, W6AMT-1, W6AMT-2" you don't broadcast it to the entire state. Be a considerate operator; pick a non-prime-time to download that 15 Kbyte file from a BBS. If you do accidentally unleash a BBS, just DISCONNECT from it-don't leave it to eventually time out.

There were no nominations from the floor at the last two PPRS general meetings for 1987 PPRS officers. Therefore, the current Board of Directors will present a slate for next year which will include AJ6T, WA6FSP, WB6RAL and WB6ASR. Jim Titstler, AI8A, the current PPRS VP has announced that he will not be able to continue on the Board due to the pressure of other commitments. Many thanks to Jim for a job well done this past year with our newsletter and running PPRS meetings.

The guest speaker at the November PPRS meeting was Jim Ericson, KG6EK. Jim is the editor of the Western Update newsletter for LOWFERS. He described LOWFER operation on 160-190 KHz and played audio tapes of CW beacons recorded at his station. LOWFERS operate unlicensed under part 15.112 of the FCC regs and are limited to 1 watt input power and 50 foot antennas. Operators select their own callsigns (ham calls may not be used). There are 26 active LOWFER beacons in the western U.S., most of whom transmit 24 hours a day. The key to successful operation on these frequencies is a good vertical transmit antenna and very narrow band audio filters on receive. Noise from SCR light dimmers is a limiting factor in many urban locations.

The December 2nd PPRS meeting will be our annual "hardware night." We try to have a wide range of TNCs in operation at the meeting. This will be a good opportunity to see what kinds of TNCs, computers and software are in use on packet radio today. N6IA (AEA programmer) will demonstrate the PK232 and PK64 with an Apple III; AI8A will operate an MFJ-1270 with N2WX level 3 firmware and Atari 1040ST; AJ6T will bring a TAPR TNC1 with WA8DED firmware and PCjr. We still need someone to dust off a VADCG TNC (even if it's not operational it will be interesting to look at). Other volunteers are needed for some more of the TNC1 and TNC2 clones. Please contact AJ6T @ N6IIU-1 if you are willing to bring your gear to the club meeting.

Please remember that PPRS memberships run for the calendar year, so it is time to renew now for 1987. Annual dues are \$18 and membership includes a subscription to Packet Radio Magazine. To continue to receive PRM without interruption, dues must be submitted by the first PPRS meeting in 1987 on January 6th. The PPRS mailing address is PO Box 51562, Palo Alto, CA, 94303. Meetings are held the first Tuesday each month at the Ampex cafeteria (411 Broadway, Redwood City). Mark the following 1987 dates on your calendar: Jan 6, Feb 3, Mar 3, Apr 7, May 5, June 2, July 7, Aug 4, Sep 1, Oct 6, Nov 3, Dec 1.

- PRM -

MINUTES OF MAPRC MEETING

Gaithersburg, MD, September 6, 1986

Reported by Eric Rosenberg, WA6YBT

Tom Clark, W3IWI, President of MAPRC, called the meeting to order at 12:00 noon, and announced that MAPRC had become incorporated as a non-profit corporation in New Jersey in March, 1986. At meeting time, there were 42 members.

I. Reports from the regions.

- K3RLI (Wilkes Barre, PA): Links exist to Canada through Rochester, N.Y., and across Pennsylvania.

- AK3P (Harrisburg, PA): Links to State College are solid, with a BBS in State College. There are good links east (which then go north and south).

- W3IWI (Washington/Baltimore): A DC LAN has been established on 145.03 with N4QQ as a BBS, and a MD LAN on 145.05 with N4QQ, W3IWI and KS3Q all as PBBS'. Over the past two years, there has been a doubling of users every five months! The W3IWI BBS marked its second birthday on the day of the meeting, and in that time has handled 22,022 messages (an average of 31/day). In August, 1986, 2111 messages were handled. In comparison, 50 messages were handled in the month of September, 1984.

- K4GNC (Virginia): The Richmond, VA links to W3IWI PBBS and EastNet on 145.01 are very reliable. A Northern Virginia LAN has been established on 145.07.

- N8FJB (West Virginia): There are few users, but lots of forwarding!

- N3CVL (Pittsburgh, PA): Reliable links from State College through Pittsburgh and on to Cleveland and points west (to Chicago) and south (to Cincinnati).

- WD8PUH (State College, PA): Just getting PBBS started, but have good links east and west.

- WB2MNF (Southern NJ): 220 is being used to move traffic through the area onto EastNet. The WB2MNF and KC2TN BBS' have formed a 145.03 LAN, with WB2RVX acting as traffic handler only, not accessible to users. The Philadelphia/Jersey Shore group has formed a LAN on 145.09. The RATS Level 3 network is based around their 145.07 dual-port digipeater.

- WB4APR (Annapolis, MD): The WB4APR C-64 BBS is the hub for the Annapolis LAN. There are no wide area digipeaters, as the cellular approach has been taken.

II. TECHNICAL SESSIONS:

A. LAN Problems and Solutions.

Brian Lloyd, WB6RQN, talked about the use of high baud rates on 220 MHz, along with a lengthy discus-

sion of duplex digital repeater. Brian detailed his work on establishing a 9600 baud link in Germantown, MD, using Hamtronics IF strips and K9NG modems. Brian has figured that 9600 baud duplex digital repeaters will increase thruput 20 - 100 times that of a 1200 baud audio repeater. In addition, he calculates an increase in thruput of a 1200 baud duplex repeater (such as the 146.135/735 repeater in Los Angeles) as 4-5 times that of a 1200 baud digipeater.

B. HF Packeting.

Dave Borden, K8MMO, gave a brief history of HF packeting, beginning with his tests on 10 and 80 meters with W4RI. The problems encountered then with packeting on HF continue today: crowded frequencies, small shift. There was a discussion of an ALE (Automatic Link Establishment) system which would shift the frequency of the radio when the connection was made (to move the stations off a calling frequency), and too, if the path was lost. There was additional discussion of "standardizing" hardware to TNCs and radio controls, along with the need to write specific gateway and ALE software.

C. Connectionless Protocol.

Bob Bruninga, WB4APR, gave an update on his connectionless protocol developed for the National Disaster Medical System drill. Although there were problems in implementing the system for the NDMS, specifically the operators lack of understanding of their specific machine.

D. C-64 BBS.

WB4APR also talked about his "fully connected WORLI style packet bulletin board" for the Commodore 64. The C-64 BBS handles bulletins and messages, but due to the limited RAM of the C-64, does not handle files. Bob pointed out two pluses to the system: the agility of the BBS to change the radio's frequency in order to move of the LAN to forward messages in or out, and the ability of the BBS to download a file or bulletin list from a nearby RLI/MBL BBS that lets its own LAN know what's on the bigger BBS.

E. AX.25 Level 3.

Terry Fox, WB4JFI, filled in for Brian Riley, KA2BQE, and talked about networking. Terry outlined the requirements for a successful network: good RF packages, support of multiple connections, supporting the end-user. Also discussed were PADS, which translate Level 1 and Level 2 packets to Level 3, and limited packet switches which support 4 or 5 connections and have a routing table based in RAM.

AMRAD has established a packet switch, WB4JFI-9, which can be accessed on 145.01 through WB4JFI-5.

F. TCP-IP.

Phil Karn, KA9Q, give a lengthy demonstration and talk on his TCP-IP system. The system allows multiple tasks to be performed during a single connect.

Continued >>>

HAPN

Box 4466, Station D,
Hamilton, Ontario,
Canada. L8V 4S7

HAMILTON AND AREA PACKET NETWORK

HAPN bulletin #5 10-Oct-86

John, VE3DVV Hamilton and Area Packet Network

We have been very busy lately with assembling our HAPN-1 cards, answering enquiries and testing the 4800 baud prototype cards. We apologize for any inconvenience the delay might cause you. The delay is about 4 weeks at present, but we will catch up soon when one of our best work horses Max, VE3DNM gets back from his well deserved holiday in Italy.

Half the prototype modems (10) have been assembled and tested. Some had a tendency to oscillate in the transmit section, but a simple RC network added on the prototype area of the board seem to fix the problem. We are presently converting our club repeaters to 4800 baud using the boards.

Some simple technical information about the modem to clear up some misconceptions follows :

1. The 4800 baud modem is not a copy of some commercial type modem, but designed by a couple of our club members over a period of several years.
2. The modem works well with the rigs we tested. Interfacing turns out to be easy in most cases for anyone having some building experience.
3. The modem uses direct frequency modulation (no subcarrier). When no data is transmitted the radio puts out a carrier in the center of the channel. The frequency switches alternating below and above the carrier frequency when data is transmitted. The baseband frequency is 2400 Hz which is 1/2 of 4800. The modulation index is about 3 Kz. The frequency spectrum fits into a normal voice channel on 2 meter.
4. The modem has it's own squelch circuit which responds in 10-15 Msec. This allows the radio's to turn around much faster.
5. The data is not randomized and no modem synchronization burst is required.
6. The modem interfaces to both FM or PM radio's. Two jumpers are installed for when a phase modulated radio is used.
7. The modem has been successfully interfaced with the following radios :

HW202	HEATHKIT	PM
HAMTRONICS	T51 EXITER	PM
IC22S	ICOM	FM
IC27A	ICOM	FM
KENWOOD	7930	FM
UTRACOM	25	PM
SANTEC	ST144/up	FM

(handheld)

8. There are three trimpots to set up (not counting the optional hardware CTS delay). These are Transmit level, Receive level and Squelch. Neither of these adjustments are critical for correct operation, but care should be taken not to overdeviate.
9. The prototype boards are designed for the VADCG TNC with a RS232 modem interface. We recently got a hold of a TAPR TNC-2 and will soon be wiring the modem up to it, bypassing the RS232 interface chips.
10. We have added the 4800 baud modem to a couple of HAPN-1 boards using the prototype area of the board. The result is a TNC that switches under software control between 4800 and 1200 baud on the same radio.

We intend to make assembly instructions available to our HAPN-1 board users for adding the 4800 baud modem. By the time the next HAPN newsletter (for HAPN-1 users) comes out we hope to have the instructions pilot tested. Our newsletter will also announce regular software enhancements as a result of user feedback.

- PRM -

MAPRC - continued from previous page.

WB6RQN is distributing the most updated versions of both the compiled versions and source code. It is also available on CompuServe's Hamnet SIG.

G. Other Topics

Tom Clark, W3IWI, talked about the National Communications System disaster test. This test utilized existing Amateur, CAP, and MARS communications systems. The lack of packet BBS' and/or experience operators at some of the destinations caused difficulties.

Tom also talked about the need for developing the connectionless protocol (as mentioned earlier by WB4APR), to allow others to copy "broadcast" bulletins...so (as Tom put it) "hundreds of users won't need to download Gateways and ARRL Letters". Connectionless protocols are being successfully used in Alaska for meteor scatter data communications at 9600 baud.

Mike Cepponis, K3MC, briefly mentioned the "Kiss TNC" project, a TNC's ROM which would allow the protocol to be written in a host computer instead of a TNC.

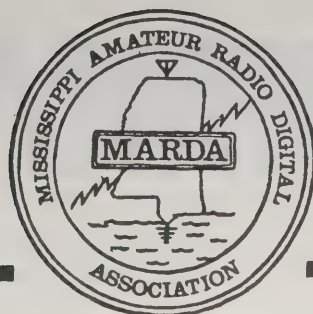
H. Miscellaneous.

As always, there were many disks passed out and ROM being swapped (KA9Q's TCP-IP and N3CVL with WA8DED v1.1 firmware). For the first time, however, there were no Xerox 820s, only PCs and clones (from off-shore "no names" to Toshiba 1100+s).

PRM

MARDA

The Official Newsletter of the



MONITOR

Mississippi Amateur Radio Digital Assn.

MISSISSIPPI ACTIVITIES

William A. Ford - WB5SXX

VICKSBURG:

Antenna improvements for VKS and a permanent home for JAN are the big news in West Central Mississippi. When VKS went on the air in April, the Vicksburg Amateur Radio Club planned to make antenna improvements during the fall. VKS is co-located with the VARC 87/27 voice repeater. The antenna VKS uses was first put into place in 1974 at the transmit site for the original Vicksburg voice repeater. When the antenna system was upgraded and a duplexer installed in 1977, the original skyhook was left in place on the tower as a backup. This site became the logical location for the digipeater.

The antenna is a Ringo Ranger at 170 feet and is fed with a double shielded flexible cable. It will be replaced with a Hi-Gain Colinear, and the feedline upgraded to 1/2 inch hardline. The existing feedline will be retained and connected to a quarter wave whip at 170 feet for possible use as the antenna for the LAN port of a dual port digi sometime in the future.

JACKSON:

The Jackson Amateur Radio Club hopes to have JAN at its permanent home at Mississippi Memorial Stadium within the next few weeks. JAN is presently located at the Mississippi Emergency Management Agency operations center. The JAN antenna is a 45 mHz ground plane which works surprisingly well.

RAZORBACKS:

There has been some success recently in forwarding traffic to the KC5JH PBBS in Little Rock. From the WB5SXX PBBS, we are forwarding to the N5BSL board in Bastrop, LA and then on to KC5JH. The path is marginal by any measure, but the traffic is moving.

ACKERMAN:

As of this writing, the K05S digi at Ackerman is still down. It is very difficult to get any packet information from North of I-20. We know there is a great deal of packet activity in the northern part of the state, particularly in the Tupelo and the Memphis Metro areas, but it seems MARDA is not

reaching these people. If the readers of PRM have contact with anyone on packet in north Mississippi, please spread the word about MARDA.

LANs DISCUSSION:

Much is being said about the creation of separate LANs to move local traffic off the TRUNK, thus preserving 145.01 for long-haul operation. This plan will eventually have some merit in Mississippi. But the fact remains, as of now this state is linked only marginally on 145.01. Any mass move to establish separate LAN digipeaters will severely deplete the limited resources which now exist.

These resources can best be utilized at present by establishing 145.01 digipeaters in locations which will help link the state. Then, as traffic increases, LANs would be established. It does absolutely no good to establish a LAN with trunking on 145.01 or some other frequency, if there is no one to link to!

Although it is a little premature to begin construction of LANs in most areas, it is not too early to begin looking at what frequencies should be used. Right now, 145.01 seems to be the most common over most of the state. It seems reasonable that 145.01 may remain, for some time, as the primary LAN-to-LAN link when LANs are established. The rural nature of Mississippi makes this feasible. It may never be necessary in the State to go to 220, 440, or even higher for linking. The traffic may never justify it.

There is a fundamental technical problem with operating a WIDE AREA DIGI on 145.01 as the first port of a dual port system, and say 145.05 as the second port. These two frequencies are only 40 kHz apart. It is near impossible to prevent interaction between the RF portions of the related equipment.

There is a section of the 2-meter band between 147.42 and 147.57 which is designated for simplex work. This portion of the spectrum is virtually unused in Mississippi. If we were to place our LANs in this frequency range, we could not only reduce or eliminate interaction, but it is also possible to use the same antenna and feedline for both ports when making appropriate coupling arrangements.

Until next month, may all your CONNECTS be many and RETRIES few.

- PRM -

ALA-NET>PACKET

[illegible]

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ADVENTURE

Tommy Rockford, K6ATX is back on the trail of high adventure! In **Death Valley QTH**, what starts as a typical field day operation becomes a matter of life and death for K6ATX and the Santa Bonita Amateur Radio Club. **SOS at Midnight** finds Tommy up against the Purple Shirt Mob and ham radio saves the day! The beachcomer seemed like a harmless character, but what did he have to hide in **CQ Ghost Ship?** Underwater adventure and ham radio join together to form the exciting conclusion to **DX Brings Danger**. Coming soon is a fifth ham radio adventure, **Grand Canyon QSO**.

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QRP Notebook by Doug DeMaw, W1FB. An exciting book for the low power enthusiast and experimenter. There are many useful construction projects described. Copyright 1986, 112 pages #0348 \$5

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PACKET RADIO - DURING THE 26-28 AUGUST 1986 DIRECTOR'S CONFERENCE THE FOLLOWING PROTOCOL AND PROCEDURES WERE ESTABLISHED FOR INITIAL DEVELOPMENT AND TESTING OF A NAVMARCORMARS HF PACKET RADIO SYSTEM. THE AX.25 LEVEL 2 VERSION 1 PROTOCOL HAS BEEN CHOSEN AS THE STARTING BASIS TO DEVELOP THIS SYSTEM. INITIAL COMMUNICATION PARAMETERS WILL BE UPPER SIDE BAND, 300 BAUD, 200 HZ SHIFT OPERATION. AS WITH ALL OTHER NAVMARCORMARS COMMUNICATION MODES, PACKET TRANSMISSION INTELLIGENCE MUST BE CENTERED WITHIN THE BANDWIDTH OF THE FREQUENCY ASSIGNED. THE FREQUENCY 11402.5 KHZ HAS BEEN ASSIGNED TO THIS PROJECT FOR 24 HOUR A DAY TESTING. ASSIGNED FREQUENCY EMISSION DESIGNATOR IS 1K24F1B. PACKET VHF OPERATION IS NOT AUTHORIZED AT THIS TIME.

THE GOAL OF THIS NETWORK IS TO ESTABLISH AN ENHANCED SET OF PARAMETERS FOR PACKET TERMINAL NODE CONTROLLERS AND MESSAGE SWITCH DEVICES FOR THE EFFICIENT USE OF PACKET IN TRAFFIC HANDLING FOR NAVMARCORMARS IN THE HF BAND. THIS GOAL INCLUDES INVESTIGATION AND DETERMINATION OF BEST OPERATING SPEEDS AND SHIFTS FOR THIS MODE OF COMMUNICATION IN OUR HF ENVIRONMENT.

THE HIGH TECHNOLOGY NETWORK COORDINATOR, MR. JIM S. GRIFFITH, NNNOPPH, 104 LADYWOOD LANE, BESSEMER, AL., 35020 (205-428-8869) IS RESPONSIBLE FOR COORDINATION AND DEVELOPMENT OF THIS SYSTEM. INVOLVEMENT IN THIS NETWORK MUST BE AUTHORIZED THROUGH NNNOPPH AND YOUR REGION DIRECTOR. AS WITH OTHER NAVMARCORMARS SPECIALTY NETWORK ASSIGNMENTS, QUARTERLY MEMBERSHIP REQUIREMENTS MUST BE MET IN ORDER TO PARTICIPATE IN THIS NETWORK.

- PRM -

COMPUTING ACROSS AMERICA - continued from page 3.

The Next 10,000 Miles -- A Sort of Prospectus

It's happening again; I can feel it. Every day-dream involves the Road; any new purchase has to be something "bikeable." The journey is obsession, addiction, religion, and lifestyle of choice -- by August I'll be rolling. Ahh.

But there are differences a-plenty. The Winnebiko is again the substrate, but it's now layered with more exotic systems than ever. Not including dedicated controllers and "smart logic," there are four on-board computers -- along with a satellite data link, ham radio station, and navigation equipment.

The biggest problem on the first trip involved time management, something that affects nomads as much as it does executives. I spent roughly half a business year pedaling -- 1,000 hours sitting alone on the bike. I would cruise all day across American vastness, composing tales in my head and itching to get my hands on the H-P Portable riding behind me. ("Ah, such a chapter shall this be!") But by evening I would be tired and hungry and surrounded by people clamoring for stories... and the day's ideas would drift away like the smells of camp cooking, gone without so much as a memory of the insights that spawned them. Wasted.

And so the bike has become a rolling word processor. There are two liquid crystal displays on the console in front of me, and a keyboard built into the under-seat handlebars (eight buttons for text along with various other controls). A dedicated 68HC11 microprocessor performs key code conversion while attending to bicycle management tasks, decoding finger combinations based upon an arcane letter-frequency-based coding scheme.

Whenever a valid character comes along, the 68HC11 passes it off to a handful of CMOS logic that is interfaced to the guts of a Model 100 -- making everything described so far look exactly like the original Radio Shack keyboard. The net effect is a full screen editor that I can control while pedaling.

But it doesn't stop there. An RS-232 line allows text in the tiny 32K buffer to be transferred to the 896K Hewlett-Packard system -- and from there to disk via the 3.5-inch floppy drive. Two modems cover all combinations of pay phones and modular jacks, and a fourth processor (CMOS Z80) handles AX.25 protocol control for packet data communications through the 2-meter ham transceiver... which will soon include an orbiting electronic mailbox known as Packsat. Of course, all this takes power, and the original 5 Watt solar panel has been replaced with a pair of 10 Watt Solarex units -- along with 8 amp-hours of Nickel-Cadmium battery to hold it all. Other electrical loads on the Winnebiko II include twin air horns, lights, flashers, Etak electronic compass, paging-type security system with distributed sensors, CB radio, stereo system, cassette deck for dictation and music, digital shortwave receiver, and the usual speed-distance-time-cadence instrumentation.

"Are yew with NASA?" asked the Ohio farmer, slowly chawin' tobacco while peering at the strange apparition gleaming beside the small-town pay phone.

"Sure," I answered, looking up from my online session on the burning pavement. "This here's one o' them Loony Excursion Modules."

And Now...

It will be August before everything (including the business structure, subject of my next article) is working well enough for me to abandon this tacky apartment complex to experience, once again, the pure exuberance of full-time travel. Once on the road, I'll publish weekly updates on GENIE; in the meantime, I'll post an occasional message to let you know how the preparations are coming. I welcome your responses, suggestions, and invitations for the hospitality database (another of the H-P's jobs) -- I can be reached via GEmail as WORDY.

And maybe somewhere, out there, we'll meet. I'll spend my life prowling neighborhoods electronic and physical, pausing for months at a time to explore and touch the magic. I guess that's the point of all this... I finally figured how to get paid for being a generalist. And I couldn't possibly do it without computers and networks.

Ain't technology wonderful?

- PRM -

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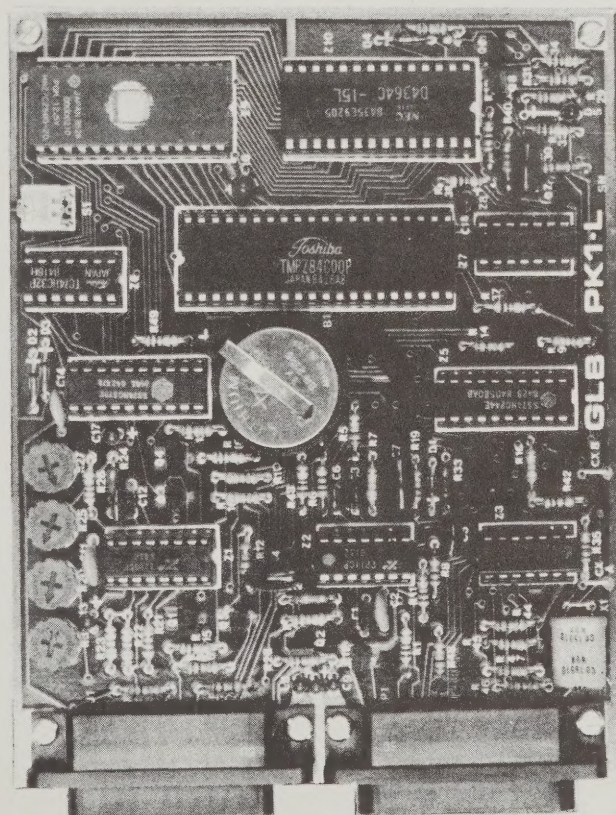
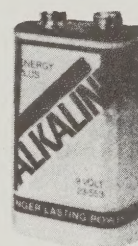
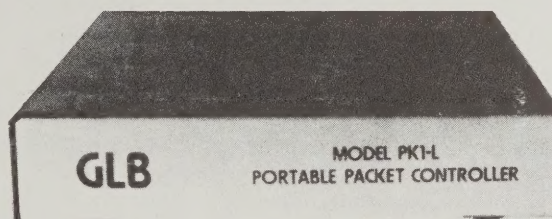
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Or This Inexpensive It Really Shouldn't Be This Easy

Remember just a few years ago, how it took a roomful of equipment just to work RTTY. And if you wanted more than one mode it took a dedicated computer system costing thousands of dollars. The new AEA Pakratts are proving it doesn't take lots of equipment or money to enjoy working all bands in five different modes.

First, A Good Idea

The idea behind the Pakratt is very simple. One controller that does Morse, Baudot, ASCII, AMTOR, and Packet, and works both HF and VHF bands. Of course the decoding, protocol, and signal processing software must be included in the unit, and connection to the computer and transceiver have to be easy. The unit also has to be small and require only 12 volts, so it will work both in the shack and on the road.

Second, Computer Compatible

It doesn't matter what kind of computer you have, we have a Pakratt for you. The PK-64 works with the popular Commodore 64 or 128, and the PK-232 works with any other computer or terminal that has an RS-232 serial port. The PK-64 doesn't require any additional programs. Simply connect to the computer and transceiver and you're on the air. The PK-232 needs a terminal or modem program for your computer. The one you're using with your telephone modem will work just fine.

Fourth, AEA Quality and Price

Not many manufacturers like to discuss quality and price at the same time. AEA thinks you want high quality and low price in any product you buy, so that's what you get with the Pakratts. Ask any friend who owns AEA gear about our quality. The people who buy our products are our best salespeople. As for price, the PK-64 costs \$219.95, or \$319.95 with the HF option. The PK-64A, an enhanced software unit with a longer flexible computer cable, costs \$269.95 or \$369.95 with the HF option. The PK-232 costs \$319.95 with the HF modem included. All prices are Amateur Net and available from your favorite amateur radio dealer. For more information contact your local dealer or AEA.

Prices and specifications subject to change without notice or obligation.

PAKRATT™ Model PK-64



PAKRATT™ Model PK-232

Third, Performance and Features

The real measure of any data controller is what kind of on-air performance it gives. While the PK-64 and PK-232 use different types of modems, both give excellent performance on VHF. The optional HF modem of the PK-64 uses independent four-pole Chebyshev filters for both Mark and Space tones, and A.M. detection. The HF option can be factory or field installed.

The PK-232 uses an eight-pole bandpass filter followed by a limiter discriminator with automatic threshold correction. The internal modem automatically selects the filter parameters, CW Fc = 800 Hz, BW = 200 Hz; HF Fc = 2210 Hz, BW = 450 Hz; VHF Fc = 1700 Hz, BW = 2600 Hz.

The PK-64 uses on screen indicators to show status, mode, and DCD (Data Carrier Detect) while the PK-232 uses front panel indicators. Both units use discriminator style tuning for HF operation. And that's just the tip of the iceberg. Features like multiple connects on packet, hardware HDLC, CW speed tracking, and other standard AEA software features are included in both the PK-64 and PK-232.

AEA

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